

Remarks

Reconsideration is respectfully requested in view of the foregoing amendments and the following remarks.

1. **Drawing Objections:** Figures 1 and 2 have been previously corrected to include a detail of the lower sidewall profiled rubber mix element 6. Figure 2 was also corrected to include a detail of the crescent-shaped profiled rubber element 80. All corrections were made with the first office action response mailed 27 August 2004.
2. **Claim Changes:** Claims 10, 13, 17, and 19 have been cancelled. Claims 1, 2, 9, 14, 15 and 18 have been currently amended, claims 21, 22, 23 and 24 are new independent claims and claims 4 and 5 have been previously amended to place the application in a condition for allowance.
3. **Rejection of Claims 1-2, 4-9, 11, 15 and 20 under 35 USC § 103(a)**

Claims 1-2, 4-9, 11, 15, and 20 were rejected over Chandezon ('038) in view of Shoemaker ('178). Once again, the tire design disclosed in Chandezon teaches a carcass profile having a tangent angle with the bead wire at least 70 degrees. The Examiner states in the Office Action that Chandezon et al. in column 1 lines 20 -25 states "an angle open towards the outside at most equal to 70°." This is not true as line 25 states "of at least 70°." Again, in column 2 line 60, Chandezon et al. gives an angle of 85°. Note that claim 1 of the present invention recites a tangent angle "less than 70 degrees." As disclosed in the first paragraph on page 9 of the present invention, the inclination of said tangent permits better clamping on the rim of the beads thus formed, better resistance to unseating and good resistance to unwinding of the carcass ply. It also makes possible the use of a narrow rim; hence better protection of the outer parts of the rim while not adversely affecting the rigidities of the sidewalls and beads of the tire. Chandezon et al teaches a tangent angle ϕ which results in a near vertical carcass path, whereas the present invention teaches a much lower angle. This is a critical difference, and is by no means a simple everyday choice of one skilled in the art.

The use of a large angle $\phi > 70^\circ$ further leads Chandezon et al. to a carcass profile having an increased radius of curvature relative to the carcass profile curvature of the instant invention. The tension in the carcass, and therefore the rigidity, is proportional to the radius of curvature of the carcass profile. Thus, a tire designer seeking to increase the rigidity of a tire would be motivated by Chandezon et al only to increase the tangent angle without the need to add the additional sidewall ring of Shoemaker. As Chandezon et al do not disclose any information on the structure of the tire radially outward of the bead, it is not possible to find any suggestion or

motivation in Chandezon et al. to add the sidewall ring of Shoemaker to increase rigidity, as is required under 35 USC 103(a).

The Examiner states at the end of page 2 and the top of page 3 that the profiled rubber mix element (7) of Chandezon et al. extends radially between said annular bead anchoring element and said additional sidewall ring, and located axially to the inside of said axially outermost carcass ply. Later, on page 3 of the Office Action, it is stated that Chandezon does not disclose an inextensible additional sidewall ring. It is never described or suggested in Chandezon to provide a sidewall with an additional sidewall ring. Nothing is disclosed concerning the radial outside end of this rubber mix element (7), or does Fig. 1 show this end. In fact, Chandezon et al. does not illustrate the tire sidewall construction so that the location and position of an additional sidewall ring cannot be determined. In addition, from Fig. 1, this rubber mix element (7) is located to the outside (not the inside) of the single carcass ply.

The rubber mix element (7) of Chandezon is commonly known in the industry as a "bead filler." The rubber portion radially outward of the annular bead anchoring element (2) of the present invention will also have a bead filler. There was no need to identify the bead filler as well as other profiled elements of each bead in the present invention. The profiled rubber mix element (6) of the present invention is in addition to any bead filler portion that may exist. This rubber mix element extends radially between and connects the additional sidewall ring 4 with the with the anchoring bead element 2, as described in the second paragraph of page 10 of the specification. That is, the profiled (rubber mix) element 6 extends between the additional (bead) ring 4 and the point of tangency T of the carcass ply 1 with the anchoring bead wire 2 of the carcass ply so as to be able to be stressed in compression. when the additional ring 4 is displaced axially toward the inside of the tire. Claims 1, 9 and 15 have been amended to clearly show this connecting relationship.

The patent of Shoemaker includes secondary bead rings 11 and 12 positioned radially outward from the main bead rings a greater distance apart than the main bead rings 9 and 9'. Forces exerted to move the secondary bead rings transversely toward the main bead rings will be resisted and the result will be a stabilizing of the tire helping to prevent side sway and shimmy. The secondary bead rings also provide an anchoring means for the sidewall reinforcing plies for anchoring and holding said plies more firmly against side sway and shimmy. Two radial reinforcing plies 12 and 13 of Shoemaker pass around a bead ring at each side and extend back substantially through the sidewall portion, to anchor each ply very firmly to a respective bead ring. Reinforcing ply 12 passes around each main bead ring 9 and 9' and the reinforcing ply 13 passes around each secondary bead ring 10 and 11. Two additional non-radial reinforcing plies 14 and 15 of Shoemaker are not anchored to any bead rings but lend stability to the tire and help prevent side sway, side deflection and shimmy. An outer radial reinforcing ply 16 extends entirely around the tire and terminates at the location of the main bead rings 9 and 9'.

Chafing strips 22 and 22 and 25 are also embedded in the main bead ring areas. In summary, there are a number of components in combination that add stability to the tire. Shoemaker does not suggest that the use of the secondary bead rings 10 and 11 alone will provide the desired stability to a tire. The five reinforcing plies must also be used. The present invention provides the lower sidewall profiled rubber mix element 6 with a predetermined Shore A hardness value to provide the desired bead compression for the tire. In addition, Shoemaker is silent about the ability to using a secondary bead ring in only one sidewall of the tire.

The instant invention obtains a portion of its overall good performance by utilizing a carcass profile having a relatively smaller radius of curvature. The reduced inherent rigidity due to this profile is augmented by the addition of the sidewall ring and the lower sidewall profiled rubber mix element. Both are necessary to the functioning of the instant invention. The instant invention acts like a frustoconical spring (Belleville-type spring) whose outer annulus is formed by the sidewall ring and whose fingers are formed by the lower sidewall rubber mix element, and whose inner annulus is formed by the annular bead anchoring element reinforcement. When the additional ring 4 is displaced axially, a greater or lesser degree of mechanical coupling exists between the additional ring and the anchoring bead wire. When the additional ring 4 is displaced axially toward the inside of the tire, the lower sidewall is able to be stressed in compression. Any relative outward axial displacement of the bead anchoring elements 2 and the inextensible additional sidewall ring will place the lower sidewall in tension, thereby adding to the rigidity of the lower sidewall portion. Neither the additional sidewall ring or the lower sidewall rubber mix element are present in the teaching or disclosure of Chandezon et al. and Shoemaker teaches the use of sidewall carcass reinforcing plies to anchor the two secondary bead rings.

4. Rejection of Claims 1-2, 4-9, 11-12, 15-16 and 19-20 under 35 U.S.C. 103(a):

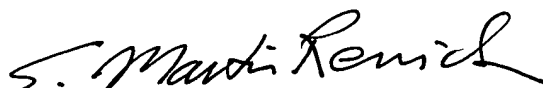
Claims 1-2, 4-9, 11-12, 15-16 and 19-20 were rejected over Drieux et al. ('047) in view of Shoemaker ('178). Drieux disclosed the same bead configuration as later used by Chandezon et al. to provide an outer protuberance to protect the rim. These two patents have the same assignee which is the assignee of record for the present invention. Drieux et al. discloses and claims in detail the configuration of the various components of the bead including different means for terminating the carcass reinforcement in relation to the bead wire 2 and the profiled rubber mix in the form of a wedge 3. Drieux et al also discloses the angle to be 85°. Once again, nothing is disclosed in Drieux concerning the radial outside end the profile 7 of rubber mix (bead filler), or does Fig. 1 show this end. In fact, Drieux et al. (as previously noted about Chandezon) does not illustrate the tire sidewall construction so that the location and position of an additional sidewall ring cannot be determined. In addition, from Fig. 1, this rubber mix profile 7 is located to the outside (not the inside) of the single carcass ply. Drieux et al. does not disclose a reinforcing ring and relies on the art of Shoemaker to teach the additional sidewall rings 10 and 11.

The same remarks as previously presented apply for Shoemaker used with the art of Drieux et al. The use of additional sidewall rings 10 and 11 of Shoemaker without the other sidewall reinforcing plies of this art does not make obvious the present invention. The lower sidewall profiled rubber mix in combination with the inextensible additional sidewall ring of the present invention gives the desired rigidity to the tire of the present invention.

5. Conclusion

Applicant respectfully submits that the foregoing amendments to the claims, in view of the remarks, now place amended claim 1 and those claims which depend on claim 1 in a condition for allowance. Claims 2, 9, 14, 15, and 18 have also been amended. The claims 10, 13-15, and 17-19 were allowed by the Examiner in the Office Action if rewritten in independent form, Claims 1, 12 and 19 have been combined to provide a new independent claim 21. Claims 1, 9, and 10 have been combined to provide a new independent 22. Claims 1, 12, and 13 have been combined to provide a new independent claim 23. Claims 1, 12, 16, and 17 have been combined to provide a new independent claim 24. These four new independent claims are considered to be in a condition for allowance and an allowance is respectfully requested. Claims 10, 13, 17, and 19 have been cancelled and claims 1-9, 11-12, 14-16, 18, and 20 remain in the application. The applicant requests the additional fee for five independent claims of $(5 - 3) \times \$200.00 = \400.00 be charged to Account Number 13-3085.

Respectfully submitted,



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